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UNITED STATES GOVERNMENT

# Memorandum

U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207

TO Francine Schacter
Through: Robert M. Mehlr, BBS
Marilyn C. Bracken, BBSC

DATE April 2, 1976

FROM June Thompson, BBSC-EUT

SUBJECT Proposed Amendment to Section 1500.17(a)(7) of FHSA for Extension of Asbestos Ban to Other Classes of Consumer Products

Pursuant to a complaint concerning the use of free asbestos to simulate ashes in gas-burning fireplaces, the Commission investigated the situation and made the determination that an amendment to Section 1500.17(a)(7) of FHSA Regulations might be the appropriate course of action to reduce the hazards resulting from such unwarranted uses of asbestos in consumer products. Furthermore, manufacturers of these products will be alerted that they may additionally have responsibilities under Section 15(b) of CPSA.

In response to the assignment by Mr. Al Dimcoff, Associate Executive Director, the Bureau of Biomedical Science has compiled the following backgound information.

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## Investigation of the Emberized Log Complaint

On November 14, 1975, Rachael Scott, Overland Park, Kansas, wrote Chairman Simpson, "petitioning the Commission to take immediate action to investigate, prevent further use of asbestos for such purpose, alert homeowners to the danger and initiate a recall of such materials."

This letter was not accepted by OGC as a petition but instead was referred by the Executive Director to BBS for follow-up investigation on December 8, 1975.

On December 12, 1975, BBS issued a request to the field for inspection of the retailer identified in Ms. Scott's letter. A subsequent inspection was conducted at the manufacturer of the asbestos ashes.

Form these two inspections we have gained information relative to the formulation of the "ashes," the manufacturing procedure, and the method of use in the consumer's home.

At the present time, we have knowledge of three firms which manufacture an asbestos containing product that is intended to be used in gas-burning fireplaces to simulate flowing ashes. We suspect there are additional firms involved.

In some cases the distributor or retailer of the gas-burning logs glues the asbestos ashes directly to the logs by use of a sodium silicate adhesive (emberized logs). At the time of installation in the consumer's home, additional asbestos ashes (approximately 1.5 oz.) may be scattered under the logs. If the consumer purchases the "emberized" gas-burning logs to install himself he may receive a package of the asbestos ashes to place under the logs. In addition, packages of the asbestos ashes can be purchased by the consumer at the retailers. Some of the exposures of the consumer to be considered are as follows: (1) when spreading the ashes in the fireplace free asbestos is likely to become airborne, (2) the asbestos loosely placed on the fireplace floor may become airborne because of drafts, etc.

The only test data that we have to assist us in determining if asbestos becomes airborne in the household as a result of this type of use is a test requested by one of the manufacturers and conducted by a private firm of occupational safety and health consultants. However, the testing firm informed the Commission that during the test only two or three small pinches of asbestos ashes were placed under the gas-burning logs. (This, in our opinion, is not the typical use pattern of the product since we have reports indicating that approximately 1.5 oz. is spread on the floor by some retailers.) Most of the ashes were glued to the logs by use of the sodium silicate adhesive.


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The test results did not show any significant difference between concentrations of asbestiform fibers in the outdoor, ambient air, nor between concentrations of asbesiform fibers in the home before or during burning of the gas logs in the fireplace.

Even so, the testing firm recommended that the manufacturer substitute a potentially less toxic mineral fiber for the asbestos, if and when a substitute is found. This recommendation is based on a need to eliminate the concern of customers who are apprehensive about their exposure and also to eliminate exposure of the producer to asbestos fibers.


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## Additional Complaints and Information Regarding the Use of Asbestos in Consumer Products

Over the past several years, the use of free asbestos in certain consumer products has been brought to the attention of the Consumer Product Safety Commission and to the attention of the Bureau of Product Safety, FDA (prior to the inception of the Commission).

. In August 1975, Dr. Irving Selikoff et al., Mount Sinai, New York, reported in the scientific literature on asbestos levels in consumer spackling, patching and taping compounds. It was found that airborne concentrations of 5 asbestos fibers/ml air (longer than 5 micrometers) were common during the use of drywall taping compounds containing asbestos - a level which exceeds interim exposure level set by OSHA. Also, during the mixing of dry wall taping compounds, fiber counts measured were found to be from 7 to 12 times greater than the current occupational standard.

Further, detectable concentrations were reportedly found in the air in adjacent rooms as much as 15 minutes after mixing had ceased.

In summary, it was pointed out that use of these materials for home repair work may expose the user and other members of the household to significant concentrations of asbestos.

. In 1974 a similar complaint was brought to the Commission's attention about the use of free asbestos to simulate ashes in fireplaces. The "Flaming Embers" Kit was being marketed in California and was reported to contain free chrysotile and amosite asbestos.

An investigation revealed it to be a "local" product not sold in interstate commerce and in March 1975, it was recommended that the Commission attempt to secure voluntary cessation of marketing the product.

. In 1971 the Bureau of Product Safety, FDA, received a request for hazard evaluation of play cigarettes containing talc "smoke." Although the powder was examined for fibrous asbestos material, none was definitely identified. (Asbestos fibers are difficult to positively identify in talc samples).

. In 1970-1971, the use of powdered asbestos to make a modelling clay for classroom art projects came to the attention of FDA. The suggested method using powdered asbestos was published in a national magazine for teachers, The Instructor. It was reported to FDA's Office of Compliance that a subsequent article would be prepared to appear in the National Education Association's Reporter warning of the hazards of using asbestos as a component of modeling clay.

. Several incidences of balloons dusted with talc containing asbestos have been reported:

In the early 1970's, Dr. Arthur Langer of Mount Sinai Hospital, confirmed the presence of asbestos fibers in the talc in rubber balloons. In that same time period, Ralph Nader called on the Bureau of Product Safety, FDA, to "destroy the existent stocks of contaminated balloons" that ..."an imminent hazard exists for a large segment of our population."

From a Press Release dataed June 29, 1971, New York City's Environmental Protection Administrator, Jerome Kretchmer (in a letter to the Secretary of HEW) noted that "...the adverse effects of larger exposures (to asbestos) have already been proven so definitely that it is only prudent to minimize all exposures unless they can be demonstrated conclusively to be harmless." He further noted that Dr. Irving Selikoff, a leading authority on...asbestos, has warned that "...no one, particularly children and young people, should be unduly exposed...we know that if a person inhales significant amounts of asbestos dust, he carries a burden that will provide a latent potential for the development of cancer for the rest of his life."

In 1971 a number of balloon samples were collected and examined by FDA. It was concluded that the powder on the balloons was talc with a small amount of crystalline material some of which "resembles chrysotile asbestos."

Asbestos fiber identification, particularly in talc, is extremely difficult and, for that reason a proposed standard for asbestos fibers in talc dated September 28, 1973 has not yet been finalized.

. In 1972, the use of papier mache materials containing high levels of asbestos in the New York public school system, was brought to the attention of the Bureau of Product Safety, then part of FDA. The Bureau of Compliance contacted Dr. Irving Selikoff's laboratory where it was confirmed that the papier mache materials contained asbestos in five of the six samples examined. The New York Board of Education acted to remove the papier mache materials from the school system. The Mount Sinai investigators were reported to have concluded that, "in the dry state, such materials could yield very high levels of airborne asbestos. Inhalation of such contaminated air could be associated with serious risk of lung cancer in later years."

BBS believes that the number of reports of free asbestos in consumer products have not been more extensive for the following reasons:

A. It probably is not widely known that asbestos-related cancers have been attributed to exposures far below the levels responsible for the occupationally-induced disease, asbestosis.


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B. As in the product currently under investigation, the packet of "emberized ashes" which bears no statement identifying its contents, BBS believes that asbestos may not be identified as a component on the labels of other consumer products. Therefore consumers are not aware of the possibility of exposure to free asbestos in certain consumer products.

C. Since the "injury" associated with exposure to free asbestos is of a chronic nature and there are no immediately experienced reactions or symptoms to the exposure(s), this type of injury is not reported to the hospital emergency room and thus would not be identified through the injury surveillance system, poison control data systems, or even death certificate reporting system, due to the long latency period between asbestos exposure and disease development.


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Background--Ban of Asbestos in General Wearing Apparel Garments

Prior to the inception of CPSC, the Food and Drug Administration (FDA), then regulating the Federal Hazardous Substances Act (FHSA), learned though reports and investigations, that certain garments were being manufactured and marketed from fabric containing 8 percent or more asbestos.

FDA first became aware of the use of asbestos in garment textiles after learning that garment workers were refusing to work with the material because of its adverse effect on human health. Garment manufacturers had reportedly imported the material because of the economic advantages it offered with respect to duties imposed by Customs.

A joint investigation was undertaken by FDA and the Federal Trade Commission. FDA was to investigate the medical implications, while FTC was to determine the amount and extent of the distribution and identify those firms which were engaged in the import, handling, processing and distribution of the material.

For its part, the Bureau of Product Safety initiated a simulated wearer use test conducted by the National Institute of Occupational Safety and Health. The resultant data were reviewed and evaluated by an ad hoc committee of nationally recognized experts on asbestos hazards.

It was the committee's consensus that this single espisode of manufacturing and sale of asbestos-containing garments did not constitute an "imminent hazard" as defined by the FHSA and that a recommendation to recover all the garments from the individual purchasers was not warranted. The committee felt that such use of asbestos in garments for the public should never be permitted again. It felt that this was a reprehensible use of a product that offers a unique and important contribution to the public safety and welfare as an insulating and fire-protection material. Other uses create an unwarranted addition of asbestos fiber to the ambient air from an inappropriate use of asbestos, a use in which none of the special properties of the fiber that contribute to the public welfare are utilized.

The committee strongly recommended that a mechanism be developed to forbid the use of asbestos yarn in garments manufactured for wear by the public. It recommended to the degree that it is feasible, the removal from the marketplace of unsold coats and unused asbestos-containing fabric which might be used in coats of this kind.

The important role of asbestos fiber for industrial and professional uses is well recognized. There is a background level of asbestos fiber in the ambient air to which individuals are exposed from birth to death and asbestos fibers in varying quantities which are demonstrable in the lungs of many adults; those who have worked in "asbestos-using occupations" have many time more than those who have not been thus employed. Any addition of asbestos to the ambient air is an unwarranted health hazard to the public, especially if resulting from misuse such as in this episode.

The following courses of action were suggested:

1. Make public the Ad Hoc Medical Committee's report alone, or in conjunction with any of the following courses of action.

   Pro: The committee's considerations and conclusions are in the public interest and will serve to further inform those who are concerned about the health effects of asbestos.

   Con: Information of this nature could serve to stir up additional controversy and could cause unnecessary alarm among those who own such coats, or who suspect the presence of asbestos in other garments. Furthermore, the committee's report is somewhat inconsistent in that it recommends removal of the coats from the market, but does not consider the problem serious enough to warrant recall at the consumer level. This would be a difficult position for the FDA to defend.

2. Publish regulations declaring general use garments containing asbestos to be hazardous substances under Section 3(a) of the Federal Hazardous Substances Act and require that those garments bear conspicuous warning labeling under the provisions of Section 3(b) of the Act.

   Pro: This would serve not only to alert the public to the potential hazard, but would have a continuing impact on future distribution of such garments. Since we understand that no one is currently using such fabrics the economic impact of this action would be negligible.

   Con: The rulemaking process is time consuming and could result in such articles remaining on the market for an unreasonable length of time. Additionally, there my be some questions regarding the suitability of such labeling.

3. Declare by regulation that adequate warnings cannot be written for asbestos-containing clothing and propose that future production of such articles be banned under the provision of 2(q)(1)(B) of the Federal Hazardous Substances Act.

Pro: This would be the most effective means of reducing exposure to such materials.

Con: There is some doubt that we could fully support a finding that the use of such garments presents the degree of hazard necessary to require banning.

General wear garments containing asbestos are now banned under Section 1500.17(a)(7) of the Federal Hazardous Substances Act, currently regulated by the Commission.


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## Definitions of Asbestos

For the sake of clarity and understanding by the public, medical community and regulated trade, it is recommended that the various agencies utilize a uniform definition of asbestos.

In the October 9, 1975 Federal Register Notice of Proposed Rulemaking, OSHA has proposed to revise the definition of asbestos as follows:

> (1) "Asbestos" includes chrysotile, amosite, crocidolite, tremolite, anthophyllite and actinolite, and every product containing any of these minerals.
>
> (2) "Asbestos Fiber" means a particulate form of asbestos, longer than 5 micrometers, with a length-to-diameter ratio of at least 3 to 1, and with a maximum diameter of 5 micrometers. (This reflects concern for the morphology and toxicity of the regulated substance rather than its geologic or mineralogic origin.)

OSHA's proposed definition is also consistent with that proposed by the American Industrial Hygiene Association, February, 1975.

Further, the "asbestos fiber" definition proposed by OSHA reflects fiber sizes known to be respirable and which can be counted using phase contract microscopy.

## Characteristics of Asbestos

One characteristic of asbestos minerals is their fibrous, spicular or needle-like shape, with a diameter-to-length ratio of 1:3 or longer. (This shape is not characteristic of the "platy" particles of talc or of the crystalline, but amorphous, silica particles of quartz, flint or sand, or the amorphous particles of soot or of ferric oxide.)

Another characteristic that the asbestiform minerals have in common are their ability to be broken into finer fibrils. Asbestos fiber refers to a particular crystallization of common nonfibrous rock-forming minerals, resulting in long fiber bundles, which continue to break down during crushing or processing into fibrils of smaller and smaller diameter until near molecular diameters are reached, while still maintaining relatively great elongation. The use of an aspect ratio (length to width) of 3 to 1 as the lower limit of a fiber (as defined in the Federal Register, NIOSH, and so forth), most certainly refers to fragments or pieces of much longer, previously recognizable asbestos fibers, since it is obvious that any other nonasbestos, nonfibrous minerals, such as feldspars, pyroxenes, amphiboles, calcite, gypsum, etc., could not be considered to have become fibrous on the basis that, during processing, they are reduced to particles or fragments which exceed an aspect ratio of 3 to 1. Many such minerals normally occur in elongated prismatic or acicular crystals, which have a tendency to elongate as they are subjected to attritioning but have little tensile strength, tend to be quite brittle, and are therefore not fibrous.

Other characteristics that the asbestos minerals have in common are their qualities of great elongation, resistance to heat and to biotransformation, flexibility, high-tensile strength and spinability.

The asbestos minerals all have nonasbestos counterparts of the same chemical composition and crystal structure which are more abundant and widespread than the asbestiform variety but the crystallization of these normally nonfibrous minerals into fibrous forms is a rare occurrence in nature.

The asbestiform varieties, as indentified in OSHA's Asbestos Dust Standard (29 CFR 1910.93a), are as follows:

| Asbestiform variety | Chemical composition | Nonasbestiform variety |
|---|---|---|
| Serpentine group: Chrysotile..... | $Mg_3(Si_2O_5)(OH)_4$..... | Antigorite, lizardite. |
| Amphibole group: | | |
| Crocidolite..... | $Na_2Fe_3Fe_2(Si_8O_{22})(OH)_2$..... | [illegible]. |
| Amosite..... | $(Mg,Fe)_7(Si_8O_{22})(OH)_2$..... | [illegible]. |
| Anthophyllite asbestos..... | $(Mg,Fe)_7(Si_8O_{22})(OH,F)_2$..... | [illegible]. |
| Tremolite asbestos..... | $Ca_2Mg_5(Si_8)_{22})(OH,F)_2$..... | [illegible] |
| Actinolite asbestos..... | $Ca_2(Mg,Fe)_5(Si_8O_{22})(OH,F)_2$ | [illegible]. |


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Chrysotile, the serpentine white asbestos is most abundant, and most widely used by industry (95%). Industry also uses the amphibole forms, blue asbestos (crocidolite) and amosite. Other amphibole asbestos forms, of less industrial importance, are tremolite, actinolite and anthophyllite, but some of these may appear in deposits of talc, and persist in marketed products.

Another characteristic of asbestos which is of significance, particularly in view of the complaint presently being reviewed by the Commission, is the transportability and/or suspendability of the fibers. In Rohl and Selikoff's study of asbestos fibers in consumer spackling compounds, it was observed that significant concentrations of asbestos remained suspended in the air 15 minutes after the mixing (of the spackling compound) had ceased and was detected in the air 15 meters away in an adjoining room. In addition, cases of mesotheliomas have been reported following exposure to asbestos transported into the home on clothes dusty with asbestos fibers.


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## Jurisdictional Authority

Interpretation of the Commission's jurisdiction over consumer products containing asbestos was addressed in a letter to the FTC for Chairman Richard Simpson's signature, included in a January 1974 position paper on asbestos.

Additionally, the status of asbestos under the FHSA was addressed by the then Assistant General Counsel, FDA, (William W. Goodrich), prior to its ban in general wear garments.


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4. Barrett

CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207

JUN 13 1974

Mr. Richard A. Olderman
Attorney/Division of National Advertising
Federal Trade Commission
Washington, D. C. 20580

Dear Mr. Olderman:

On behalf of the Commission, I am writing to respond to the questions raised in your letter of October 25, 1973, to Mr. Russell Smith, Office of Standards Coordination and Appraisal, concerning the Consumer Product Safety Commission's jurisdiction, priority, and willingness to participate in studies regarding consumer products containing asbestos.

On the question of jurisdiction, the Consumer Product Safety Commission has jurisdiction under the Consumer Product Safety Act to regulate all consumer products that present an unreasonable risk of injury to the public. "Consumer product" is defined in Section 3 of the Consumer Product Safety Act (15 U.S.C. 2052) as:

> "...any article, or component part thereof produced or distributed (i) for sale to a consumer for use in or around a permanent or temporary household or residence, a school, in recreation or otherwise, or (ii) for the personal use, consumption or enjoyment of a consumer in and around a permanent or temporary household or residence,..."

In order for a product to be classified as a consumer product, it is not necessary that it actually be sold to a consumer, but only that it be produced or distributed for his use. Products which are primarily or exclusively sold to industrial or institutional buyers would also be included within the definition of "consumer products" so long as they were produced or distributed for use by consumers (H.R. Rep. No. 92-1153, 92nd Cong., 2d Sess. (1972).)

The Commission will afford the term "consumer product" as broad an interpretation as possible so as not to preclude any area of regulation. Thus, the term will include such products as cement-asbestos wallboard which is produced for the use and enjoyment of consumers.

It is likely that some products will fall within the jurisdiction of other agencies such as the National Highway Traffic Safety Administration. However, if the item in question may be used as a consumer product, even though that may not be its predominant use, it would also fall within the jurisdiction of the Consumer Product Safety Commission.

In addition, the Commission has jurisdiction over asbestos under the Federal Hazardous Substances Act (FHSA) (15 U.S.C. 1261 et seq.). The FHSA includes within the definition of "hazardous substance" any substance or mixture of substances which is toxic. Toxic is defined as any substance (other than a radioactive substance) which has the capacity to produce personal injury or illness to man through ingestion, inhalation or absorption through any body surface. In our opinion, this covers asbestos and regulations already exist under the FHSA banning certain garments containing asbestos (37 F.R. 14873).

In response to the other portion of this question, it is quite possible that a product of great utility will nevertheless pose an "unreasonable risk of injury." The Commission will proceed on a case-by-case basis in making a determination as to what will pose an "unreasonable risk of injury."

On the question of priority that would be given products containing asbestos, it is established Commission policy to base its priority for action on the degree of unreasonable risk of injury presented by a product. This principle will be applied to products with a high level of risk because of the hazard of asbestos. Products containing asbestos will be examined on a case-by-case basis insofar as practicable. When specific products are found where the hazard is asbestos-related, they will be dealt with accordingly, e.g., Hazardous Substances Act Regulation banning

general-use garments containing asbestos 16 CFR 1500.17 (a)(7).

Regarding the possibility of conducting a joint study, we recommend first the formation of a small FTC/CPSC task force to work with OSHA-NIOSH and other sources and interested parties to accumulate already existing data from actual quantitative studies. The task force would include representation from our Bureaus of Biomedical Science, Compliance, Engineering Sciences, Epidemiology, and from our Office of Standards Coordination and Appraisal. The objective would be to keep in touch with the activities of the Health, Education, and Welfare Committee to Coordinate Toxicological Research and Related Programs, and with NIOSH, EPA, the National Cancer Institute and other concerned organizations, with respect to biological and epidemiological studies of exposure to asbestos. Other actions will flow from an analysis of the data collected by the task force.

We hope this information is helpful. If we can be of further assistance, please let us know.

Sincerely,

Frederick Barrett
Executive Director

cc: F. Barrett
B. Ludden
S. Dunn
M. Brown
L. Sharman
R. Early

Prepared by: RSMITH:aw:3/25/74:x7197
Approved by: RDEARLY
Revised: 5/28/74 SDUNN:nhb

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF THE SECRETARY
ROCKVILLE MD 20852

JUL 8 1971

OFFICE OF THE GENERAL COUNSEL

MEMORANDUM

TO : Dale C. Miller
Chief, Case Guidance Staff
Bureau of Product Safety

FROM : William W. Goodrich
Assistant General Counsel
Food, Drugs, and Environmental Health Division

SUBJECT: Asbestos - Status Under FHSA

The following comments are keyed to your memo of June 17, 1971.

1. For FHSA to apply to fabric containing 8% asbestos, it must be found that the fabric is a substance which "may cause substantial personal injury or substantial illness during or as a proximate result of any customary or reasonably foreseeable handling or use ...", 15 U.S.C. 1261(f)(1)(A), and that the fabric is toxic, 15 U.S.C. 1261(f). A toxic substance is defined as one which is "capable of producing personal ... illness in man through ... inhalation ..." The asbestos appears to be capable of producing personal illness through inhalation. Therefore, the FHSA could apply and the remedies available thereunder would also apply.

2. The fact that inhalation of asbestos particles presents a long term rather than an acute hazard would have no bearing upon the applicability of the definition of "toxic" in §2(g) to the suspected fabric. The act does not speak in terms of long range or short range hazard, but merely in terms of hazard to public health.

3. Since the toxic definition could apply, there would probably be no necessity for a finding under Section 3(a). The Secretary could, under 3(a), declare the fabric to be a toxic, hazardous substance, within the definition of 15 U.S.C. 1261(f)(1)(A). Formal administrative rulemaking procedures would be required.

4. It is not necessary to declare the products imminent hazards before proceeding. If the fabric is "toxic" and likely to cause bodily injury, it would be deemed a misbranded hazardous substance under the FHSA for failure to adequately warn potential users of the danger involved in its use. 15 U.S.C. 1263(a). As a misbranded hazardous

substance, the fabric would be subject to seizure and condemnation. Since it appears that the fabric has already been completely distributed, there would be no need to seek either an injunction or restraining order against further distribution.


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Hazards of Occupational Exposure to Asbestos and Proposed OSHA Regulations

The first case involving asbestos and human disease was recorded in 1907, and the first case in the United States was reported in 1930. However, a standard for occupational exposure to asbestos was not promulgated until 1971 by OSHA (29 May 1971, 36 FR 10466).

By that time (1971), it was widely recognized that occupational exposure to asbestos resulted in a high incidence of the disease, asbestosis--a diffuse, interstitial, nonmalignant scarring of the lungs. Asbestosis is characterized by restrictive pulmonary function, finger clubbing, rales (dry cracking sounds within the lung) and dyspnea (undue shortness of breath). Even in the absence of further exposure, asbestos fibers trapped within the lung continue their biological action. In severe forms of the disease, death results from the inability of the body to obtain adequate oxygen or from the inability of the heart to pump blood through the scarred lungs.

The reduction of asbestos exposure levels set by the 1972 OSHA Asbestos Standard was based on data which indicated the lowered levels would be sufficient to prevent asbestosis. From the British Occupational Hygiene Society's evaluation of asbestos factory data relating to the incidence of disease, it was calculated that lowering the permitted asbestos exposure level to 2 fibers/ml would permit a full working life-time (50 years) without substantial risk of developing asbestosis.

In setting its 1972 standard, OSHA hoped that reduction of exposure levels designed to prevent asbestosis would also serve to control the hazard of asbestos-related cancers. However, extension of data within recent years now has required OSHA to refocus its primary concern (standard-setting for exposure to asbestos) from prevention of asbestosis to a new orientation--that of primary concern with the prevention of asbestos-related cancer.

Reduction of asbestos exposure to levels sufficient to prevent asbestosis is known, at least in some instances, to be insufficient to prevent asbestos-cancer.

Subsequent to OSHA's 1972 standard-setting for asbestos, important new information on the broadening spectrum of cancers associated with asbestos have become available, including data of many non-occupational manifestations of asbestos diseases. In addition, there is further data indicating the occurrence of asbestos cancer among individuals exposed to low levels of asbestos, as in environmental circumstances, or to brief intermittent exposures to higher levels. Analysis of the history of exposure among individuals in a large series of cases in Great Britain and South Africa have provided evidence that brief or intermittent exposure to asbestos may, after decades, result in mesothelioma. In these cases it appears that the exposure was less than the 100 fibers-years/ml standard set by the current OSHA regulation.

It is further suggested that the same discrepancy between present (OSHA) projected exposures and the risk of asbestos cancer exists when considering cases of mesothelioma resulting from household contact to asbestos among members of families of asbestos workers (Lillington, 1974) or among residents living in the vicinity of asbestos plants.

It is also noted that asbestos diseases have been described among shipbuilding and ship repair workers who, although not actually working with asbestos, were inadvertently exposed to asbestos dust resulting from the use of asbestos products by a relatively few workers by virtue of working in the same areas.

Therefore, on the basis of new evidence of asbestos-related cancers and of new analytical techniques becoming available to evaluate and monitor asbestos exposure, OSHA has proposed (FR v. 49, no. 1972, October 9, 1975) a further reduction of the exposure level to asbestos of an 8-hour time-weighted average (TWA) not to exceed a concentration of asbestos fibers in excess of 0.5 fibers/$cm^3$ (or 500,000 fibers/$m^3$) of air, with a ceiling (or excursion) level not to exceed 5 fibers/$cm^3$ (or 5 million fibers/$m^3$) of air, as determined over a period up to 15 minutes.


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## Non-Occupational Exposure to Asbestos

Most of our knowledge about the hazards of asbestos is based upon observations in occupational settings. However, it is becoming increasingly evident that exposures to asbestos at low levels (sufficient enough to prevent asbestosis) is not sufficient to prevent asbestos-associated cancer.

Mesothelioma, as well as other cancers and even asbestosis can result from mild intermittent exposure to asbestos. Among the many reported cases of mesothelioma following short, non-occupational exposure to asbestos include cases which followed exposure to dusty (asbestos) clothes in the home. In addition, asbestosis is often absent, indicating relatively small exposure to asbestos dust.

Dr. Thomas Haley, in his recent review reported the following non-occupational exposure hazards of asbestos: A study by Lieben and Pistawaka, conducted in Pennsylvania, revealed that of 42 persons with reported mesotheliomas, 10 had worked or lived near an asbestos plant, and three were members of families which included asbestos workers. In 11 cases, no history of exposure could be obtained.

A London study of 76 patients with mesothelioma found that 31 (40.8%) had occupational exposure; nine (11.8%) had relatives who worked with asbestos; 11 (14.5%) had lived within half a mile of an asbestos factory; and 25 (32.9%) had no known contacts.

A paper published in 1965 described a woman who, as an infant attended school near an asbestos dump, which on occasion served as a play area. The woman developed pleural mesothelioma at age 55 and died soon thereafter; two other who attended the same school as youngsters also died of this desease.

A 1973 petition sent to the Federal Trade Commission by the Center for Science in the Public Interest regarding the hazards of asbestos noted the following: Readings taken by Selikoff's group at various sites in New York City (all locations being distant from known asbestos sources) found the chrysotile level of the ambient air to be as follows: Manhatten, 25-60 fibers of asbestos in 10-9 gm/cu m; Bronx, 25 to 28 fibers per 10-9 gm/cu m; Brooklyn, 19 to 22 fibers per 10-9 gm/cu m; Queens, 18 to 29 fibers per 10-9 gm/cu m; and Staten Island, 11 to 21 fibers per 10-9 gm/cu m. These amounts may appear at first reading to be rather small. However, chrysotile asbestos fragments very easily into fibrils 300-400 A in diameter. Therefore, 10-9 gm of chrysotile asbestos could represent a million fibrils.

The chrysotile content of air in Philadelphia was found to be 45-100 fibers per 10-9 gm/cu m; in Ridgewood, New Jersey it was discovered to be 20 fibers per 10-9 gm/cu m; and in Port Allegany, Pennsylvania, a more rural community, it was found to be 10-30 fibers. All readings were taken in 1972.


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These figures establish a background of asbestos air contamination in urban areas. The contamination is, of course, higher in areas adjacent to construction sites.

Asbestos is a pollutant of urban air; it is found in the lungs of urban dwellers. Although the dose-risk levels are not precisely known, these individuals do have a greater chance of developing lung cancer, cancer of the gastro-intestinal tract and mesothelioma than individuals not exposed to asbestos fibers.


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## Free Fiber Availability in Consumer Products

Most asbestos in consumer products is "locked-in", or bound by other constituents in the product (resins, cements, binders, plastics, etc.) so that the fibers are not freely available to become airborne.

However, there are several categories of products wherein the asbestos fibers are freely available to become airborne and consumer products from any of these categories would pose an inhalation hazard.

The Center for Science in the Public Interest Petition included the attached list of nonlocked-in asbestos products which was submitted to OSHA by Johns-Manville, the Nations' principal fabricator of asbestos products, during the 1972 hearings on occupational standards for asbestos dust.

The list is not complete, but is included here because it presents the most comprehensive breakdown available. It should be noted that even a "locked-in" product may release asbestos fibers when cut or sanded. However, this inadvertent release of asbestos fiber from products containing "locked-in" asbestos is not being addressed in this proposed action.


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## NONLOCKED-IN ASBESTOS PRODUCTS

| Product | Approximate Range of Asbestos Contents in Product as Used |
|---|---|
| **Acoustical Products** | |
| Dry spray type | 10 - 15 |
| Foamed asbestos | 85 - 90 |
| **Calcium-Silicate Sheets** | |
| Low density sheets (less than 50#/ft 3) | 25 - 35 |
| **Cements** | |
| Gypsum joint cements (spackling compounds) | 2 - 4 |
| Insulating cements | 20 - 100 |
| **Insulations** | |
| Low density calcium silicate binders | 7 - 12 |
| Corrugated paper | 85 - 95 |
| Low density magnesia binders | 8 - 12 |
| High temperature blocks & bricks | 8 - 12 |
| **Papers & Felts** | |
| Commercial grades (unsaturated) | 85 - 90 |
| Roofing felts (unsaturated) | 85 - 90 |
| Gaskets (unsaturated or not encapsulted) | 85 - 90 |
| Millboards (unsaturated or uncoated) | 85 - 90 |
| **Stucco & Plaster** | |
| Dry mix cement stucco | 0 - 1% |
| Dry mix decorative | 0 - 2% |
| **Textiles (unsaturated or uncoated)** | |
| Braided products | 75 - 100% |
| Cloth | 75 - 100% |
| Listings | 75 - 100% |
| Wicks | 75 - 100% |
| Yarn | 75 - 100% |


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## Fiber Identification Problems

The increasing knowledge of the health hazards caused by airborne asbestos has focused attention on the problems of fiber identification and quantitative determination of asbestos in admixtures with many other constituents commonly found as air contaminants.

Currently, the electron microscope is the only instrument capable of measuring the morphology, chemistry, and crystal structure of asbestos fibers. Several laboratories perform the analysis for airborne asbestos fibers, and while they have reasonable internal self consistency, the results obtained by the separate laboratories are often widely different. However, this methodology is expensive, extremely time-consuming and requires highly trained specialists for analyses.

Various other methods such as x-ray diffraction, infra-red spectroscopy, etc. have been utilized for quantitative determination of asbestos with varying degrees of success.

OSHA's sampling and evaluation method for identification of asbestos fibers is the NIOSH Membrane Filter Method whereby samples are collected by drawing air through a cellulose ester membrane filter by means of a battery powered personal sampling pump. The filter, after collection of the sample, is transformed from an opague solid to a transparent, optically homogenous gel. The fibers are sized and counted by phase-contrast microscopy at 400-450X magnification.


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## Canadian Proposal for Ban on Consumer Products Containing Free Asbestos

Canada has proposed to ban the importation of crocidolite asbestos (believed to be the most hazardous of the asbestiform minerals) and to ban the sale of certain consumer products containing free asbestos fibers which may be released into the ambient air including dry-mix modelling clays and rubber items (including balloons) where the surface has been dusted with talc containing asbestos.


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